

REMARKS

Support for Claim Amendments

Claim 19 has been amended to recite that “the toughening agent is a poly(vinyl butyral-*co*-vinyl acetate) resin or a partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resin.” Support for this amendment may be found in the paragraph bridging pages 14 and 15 of the application as filed.

Claim 21 has been amended to correct the spelling of “styrene.”

Claim 27 has been amended to delete a redundant “resin” that was inadvertently inserted when the claim was amended in Applicants’ 12/30/02 amendment.

Information Disclosure Statement

The office action states that the information disclosure statement filed 8/11/03 fails to comply with 37 C.F.R. §1.98(a)(2). 1/20/04 Office Action, page 2, paragraph 3. Applicants do not have any record of an information disclosure statement filed 8/11/03. However, an information disclosure statement filed 12/12/02 was submitted without a Form 1449 or reference copies. Applicants are submitting herewith an information disclosure statement that includes a Form 1449 and copies of cited references corresponding to the 12/12/02 submission.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 19 and 20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As discussed above, Claim 19 has been amended to recite that “the toughening agent is a poly(vinyl butyral-*co*-vinyl acetate) resin or a partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resin.” Applicants believe that Claim 19 now properly depends from Claim 1, and they respectfully request the reconsideration and withdrawal of the rejection of Claims 19 and 20 under 35 U.S.C. § 112, second paragraph.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-6, 8-10, 16-22, 24-27, and 37 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over EP 0 921 158 to Yeager et al. in view of U.S. Patent No. 6,518,362 to Clough et al. and U.S. 4,496,695 to Sugio et al. Applicants respectfully traverse this rejection.

EP 0 921 158 to Yeager et al. (“Yeager”) generally describes poly(phenylene ether) (PPE) thermoset compositions comprising PPE, an allylic compound, at least one of a brominated epoxy compound and a mixture of a brominated and non-brominated epoxy compound, and at least one of a cure catalyst or a curing agent. Yeager abstract. Yeager mentions the use of an “additional thermoset or thermoplastic resin additive . . . for the purpose of improving properties such as toughness, impact strength or thermal stability.” Yeager, page 9, lines 37-38. As acknowledged by the Examiner, no specific toughening agents are taught. 1/20/04 Office Action, page 5, paragraph 9.

U.S. Patent No. 6,518,362 to Clough et al. (“Clough”) generally describes a curable melt blended composition prepared by melt blending a thermoplastic polymer comprising polyphenylene ether (PPE) polymer and a polystyrene polymer, and optionally a compatibilizer, with an uncured epoxy component comprising a curable epoxy and an epoxy curing agent, at a temperature greater than 150° C and without addition of solvent. Clough abstract. In the Background section, Clough mentions that it is known “to blend a small amount of elastomeric or thermoplastic material into a hard thermosetting resin in order to toughen . . . the thermoset,” and that suitable elastomeric or thermoplastic toughening agents include “natural rubbers, polyolefins, and vinyl copolymers such as poly(styrene-co-butadiene).” Clough, col. 1, lines 17-22.

U.S. Patent No. 4,496,695 to Sugio et al. (“Sugio”) generally describes a curable resin composition comprising: (a) a polyphenylene ether resin, (b) a maleimide component and/or a cyanate ester component, and (c) an epoxy compound. Sugio abstract. Sugio teaches several examples of resins used “in order to improve chemical or physical properties of coating, laminate or molding obtained from the composition.”

Sugio, col. 11, lines 12-13. These include, inter alia, “vinyl butyral resin” and “vinyl acetate resin.” Sugio at col. 11, lines 17-18. Mixtures of resins may be used. Sugio at col. 11, line 20.

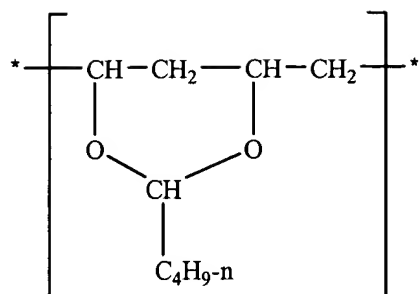
Applicants respectfully assert that their Claim 1 is patentable over Yeager in view of Clough and Sugio because the Office has not established a prima facie case of obviousness against Claim 1.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A 1970).

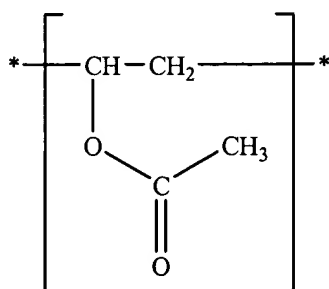
Applicants’ Claim 1 recites that the composition comprises “a toughening agent selected from the group consisting of poly(vinyl butyral-*co*-vinyl acetate) resins, partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins, styrene-butadiene-styrene block copolymers, styrene-ethylene-styrene block copolymers, and styrene-ethylene-butylene-styrene block copolymers.” The cited references collectively fail to teach this limitation. As acknowledged by the Examiner, Yeager does not teach specific toughening agents. The examiner has pointed to Clough’s teaching of “poly(styrene-*co*-butadiene),” but those of ordinary skill in the art will appreciate that the random copolymer “poly(styrene-*co*-butadiene)” disclosed by Clough is chemically distinct from Applicants’ Claim 1 block copolymer toughening agents “styrene-butadiene-styrene block copolymers, styrene-ethylene-styrene block copolymers, and styrene-ethylene-butylene-styrene block copolymers.” Furthermore, Clough does not teach Applicants’ Claim 1 “poly(vinyl butyral-*co*-vinyl acetate) resins” or “partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins.” So, like Yeager, Clough fails to teach any of Applicants’ Claim 1 toughening agents.

Sugio does not cure this deficiency. The Examiner acknowledges that “Sugio et al do not specifically teach poly(vinyl butyral-*co*-vinyl acetate) or the hydrolyzed

derivative thereof” but goes on to state that “given that vinyl butyral is a known derivative of vinyl acetate and given that Sugio teach that these two resins may be utilized as a mixture, a copolymer of the two resins would have been an obvious functionally equivalent toughening resin, wherein it is further well known in the art that partially hydrolyzed derivatives of vinyl acetate resins are functional equivalents to the vinyl acetate resins.” 1/20/04 Office Action, page 5, paragraph 9. Applicants respectfully disagree. First, the Examiner’s argument ignores the well-settled principle that all claim elements must be taught or suggested. MPEP 2143.03; *In re Royka*, 180 U.S.P.Q. 580 (C.C.P.A. 1974); *In re. Wilson*, 165 U.S.P.Q 494, 496. Here, it is undisputed that Sugio does not teach poly(vinyl butyral-*co*-vinyl acetate) resins or partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins. Second, to the extent that “functional equivalency” would be relevant to the prima facie obviousness of an Applicant’s chemical compound over a prior art compound, it would be because of a close structural similarity of the compounds and an express prior art teaching of the equivalence of the moieties that constitute the difference in chemical structure. *See, e.g., In re Mayne*, 104 F.3d 1339 (Fed. Cir. 1997)(affirming functional equivalence of isomeric amino acids leucine and isoleucine in compounds consisting of a protein comprising methionine, an enterokinase cleavage site, and either human or bovine growth hormone). Even when two chemical moieties appear chemically similar, they may not be “functionally equivalent” in the sense that substitution of one for the other is obvious. *See, e.g., Application of Lunsford*, 357 F.2d 385 (1966)(considering cited references as a whole, substitution of pyrrolidyl group for piperidinyl group was not obvious). In the present case, no reference of record teaches that Sugio’s “vinyl butyral resin” and “vinyl acetate resin” are functionally equivalent to Applicants’ poly(vinyl butyral-*co*-vinyl acetate) resins or partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins. Furthermore, the chemical differences between Sugio’s resins and Applicants’ resins are so great as to preclude any argument based on structural similarity. For example, to say that Applicants’ poly(vinyl butyral-*co*-vinyl acetate) is structurally similar to Sugio’s “vinyl butyral resin” or “vinyl acetate resin” requires an assertion that the repeating unit of a vinyl butyral resin



is structurally equivalent to the repeating unit derived from vinyl acetate



No chemist of ordinary skill in the art would make such an assertion. In short, there is no basis in cited art or case law of record to support the Examiner's assertion that it would be prima facie obvious to substitute Applicants' poly(vinyl butyral-*co*-vinyl acetate) resins or partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins for Sugio's vinyl butyral resin, vinyl acetate resin, or mixtures thereof.

Given that Sugio does not teach Applicants' other Claim 1 toughening agents (styrene-butadiene-styrene block copolymers, styrene-ethylene-styrene block copolymers, and styrene-ethylene-butylene-styrene block copolymers), Sugio fails to teach any of Applicants' Claim 1 toughening agents.

Thus, Yeager, Clough, and Sugio collectively fail to teach any Applicants' Claim 1 toughening agents. A prima facie case of obviousness has therefore not been established against Claim 1, and Claim 1 is patentable over Yeager in view of Clough and Sugio. Given that Claims 2-6, 8-10, 16-22, 24-27, and 37 each include or further limit the limitations of Claim 1, they, too, are patentable over the cited references.

Accordingly, Applicants respectfully request the reconsideration and withdrawal of the

rejection of Claims 1-6, 8-10, 16-22, 24-27, and 37 under 35 U.S.C. § 103(a), as allegedly unpatentable over Yeager in view of Clough and Sugio.

Claim 23 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Yeager in view of Clough and Sugio and further in view of U.S. Patent No. 5,397,822 to Lee, Jr. et al. Applicants respectfully traverse this rejection.

Yeager, Clough, and Sugio are each discussed above.

U.S. Patent No. 5,397,822 to Lee, Jr. et al. (“Lee”) generally describes a thermoplastic resin composition having in admixture a polyphenylene ether resin and an elastomeric block copolymer wherein the block copolymer has in admixture a triblock copolymer A-B-A' and a diblock copolymer A-B with A and A' being polymerized vinyl aromatic hydrocarbon blocks such as styrene and B being an ethylene-alkylene block such as ethylene-butylene. Lee abstract. Lee teaches specific phosphate flame retardants, including “diphenyl phosphates of resorcinol.” Lee, col. 8, lines 31-32. Lee does not teach any of Applicants’ Claim 1 toughening agents.


Claim 23 depends ultimately from Claim 1 and thereby incorporates all the limitations of Claim 1. Since Lee does not remedy the failure of Yeager, Clough, and Sugio to teach Applicants’ Claim 1 toughening agents, the combined references Yeager, Clough, Sugio, and Lee cannot support a prima facie case of obviousness against Claim 23. Applicants therefore respectfully request the reconsideration and withdrawal of the rejection of Claim 23 under 35 U.S.C. §103(a) over Yeager in view of Clough and Sugio, and further in view of Lee.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 07-0862 maintained by Assignee.

Respectfully submitted,

CANTOR COLBURN LLP
Applicants' Attorneys

By: 
J. Michael Buchanan
Registration No. 44,571

Date: April 2, 2004
Customer No.: 23413
Telephone: (860) 286-2929